MUTOH

High-performance SCRIBER

ET3600

Installation and Operation Manual

Preface

We would like to express our appreciation for your purchase of the ET3600 Scriber, a powerful drafting tool, designed by Mutoh engineers to eliminate the troublesome task of manual lettering. Simply input lettering data to the ET3600 and sit back and watch it automatically letter, including symbols and figures. To ensure that you get the most out of your new scriber, we recommend that you read carefully and follow the instructions in this document.

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1. FEATURES

The MUTOH ET3600 Scriber is another example of Mutoh's dedication to the automation of drafting work. It can be easily programmed to plot alphanumeric data and symbols with high resolution and speed. Interactive input ensures that errors are caught before actual lettering begins. Data indicated on the easy-to-read two-line display is plotted using a technical pen.

The use of a flat-panel configuration enables the keyboard to be completely dustproofed. This keyboard enables easy access of up to 206 letters and graphics, including alphanumeric characters, symbols, figures and lines.

The operation unit provides power to the ET3600 and can accommodate up to two application cassettes, used to store specially designed symbols and characters.

A newly designed backup function can be used to store up to 1500 characters and perform editing operations on these characters.

The overall layout and size of the ET3600 have been determined by applying human engineering concepts, and the overall high quality of the ET3600 is attested by the use of a high-density double-layer printed circuit board, a circuit design with sufficient margin and the use of a light and durable aluminum diecast case.

2. PRECAUTIONS FOR USE

The following precautions should be observed with respect to use of the ET3600.

- Since the ET3600 uses many precision components, avoid subjecting it to direct sunlight, high temperatures or heat-producing equipment, high humidity and high dust levels. During operation, excessive shock or twisting may cause deformation or misoperation.
- Do not lay objects on the display area and avoid applying excessive pressure to the display area.
- If the unit is subjected to high noise levels or excessive shock during operation, memory contents may be destroyed or otherwise disturbed. If such a condition occurs, switch the power off and then on once again or press the reset switch to initialize the unit.
- During operation, avoid touching the cartridge arm onto which the technical pen is mounted.
- Do not switch power off during operation and take care not to step on the connecting cable.
- Should the unit become soiled, wipe it off using a soft, dry cloth. Do not use chemicals such as thinners or benzene which may damage its surface.
- Take care that liquids or other foreign matter do not enter the unit, as these may cause failues.
- The maximum inclination angle of the drawing board with the ET3600 mounted is 20°. For use at higher angles of inclination, first check that the vertical brake of drafting machine has been applied to ensure that the unit does not drop.
- Should the ET3600 exhibit improper operation, do not attempt to disassemble it. First, read Section 10 of this document and then contact the dealer from which you purchased the ET3600.

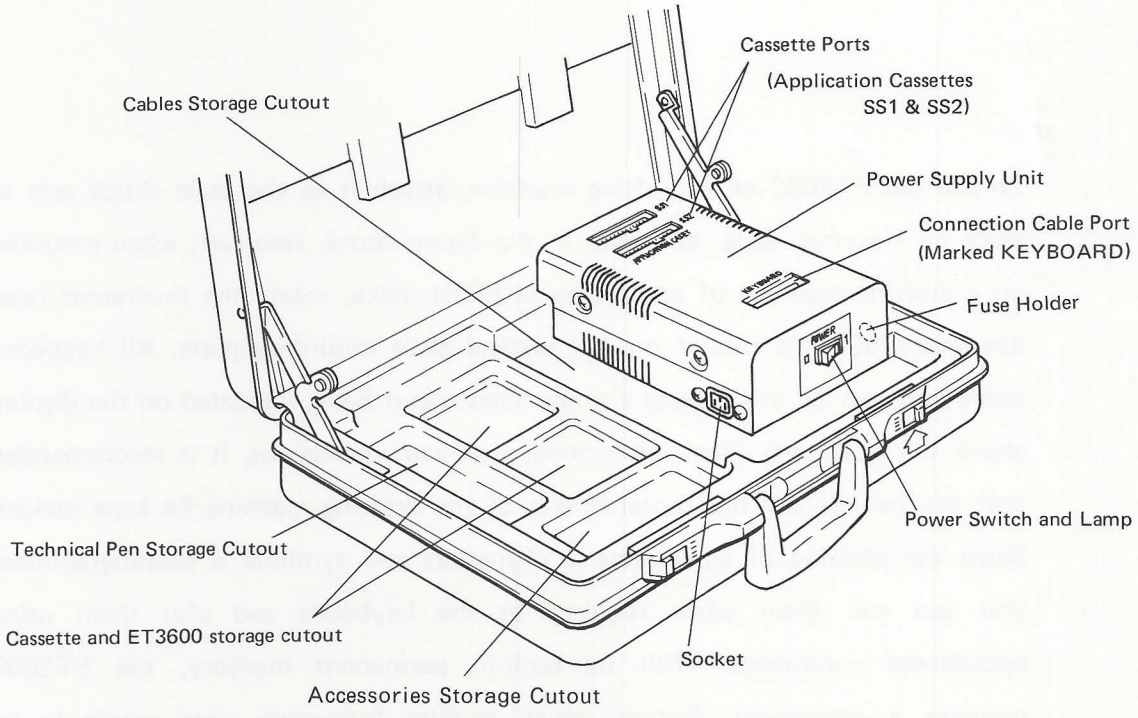
3. NAMES OF ET3600 PARTS

3-1 Carrying Case

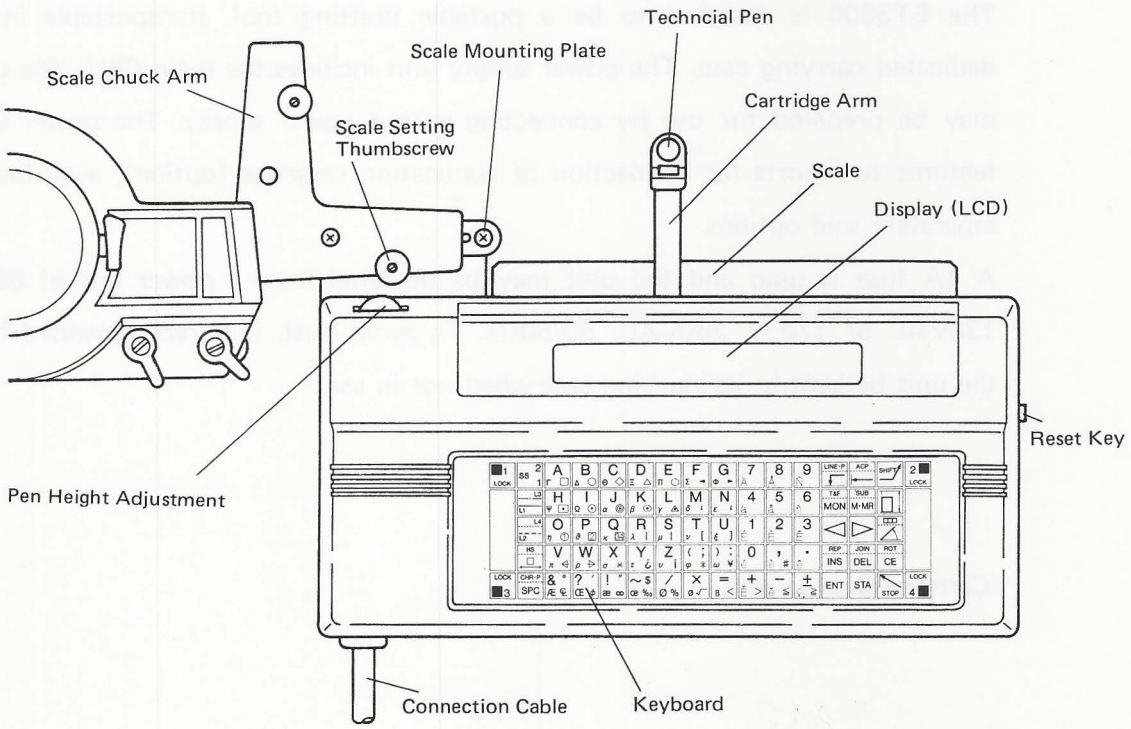
The ET3600 is designed to be a portable drafting tool, transportable in its dedicated carrying case. The power supply unit includes the main CPU. The unit may be prepared for use by connecting it to a power supply. The power unit features two ports for connection of application cassettes (option), available as separately sold options.

A 1A fuse is used and the unit may be powered from a power line of 85 ~ 130VAC or 170 ~ 260VAC, 50/60Hz. To avoid dust, it is recommended that the unit be kept in its carrying case when not in use.

Carrying Case Layout



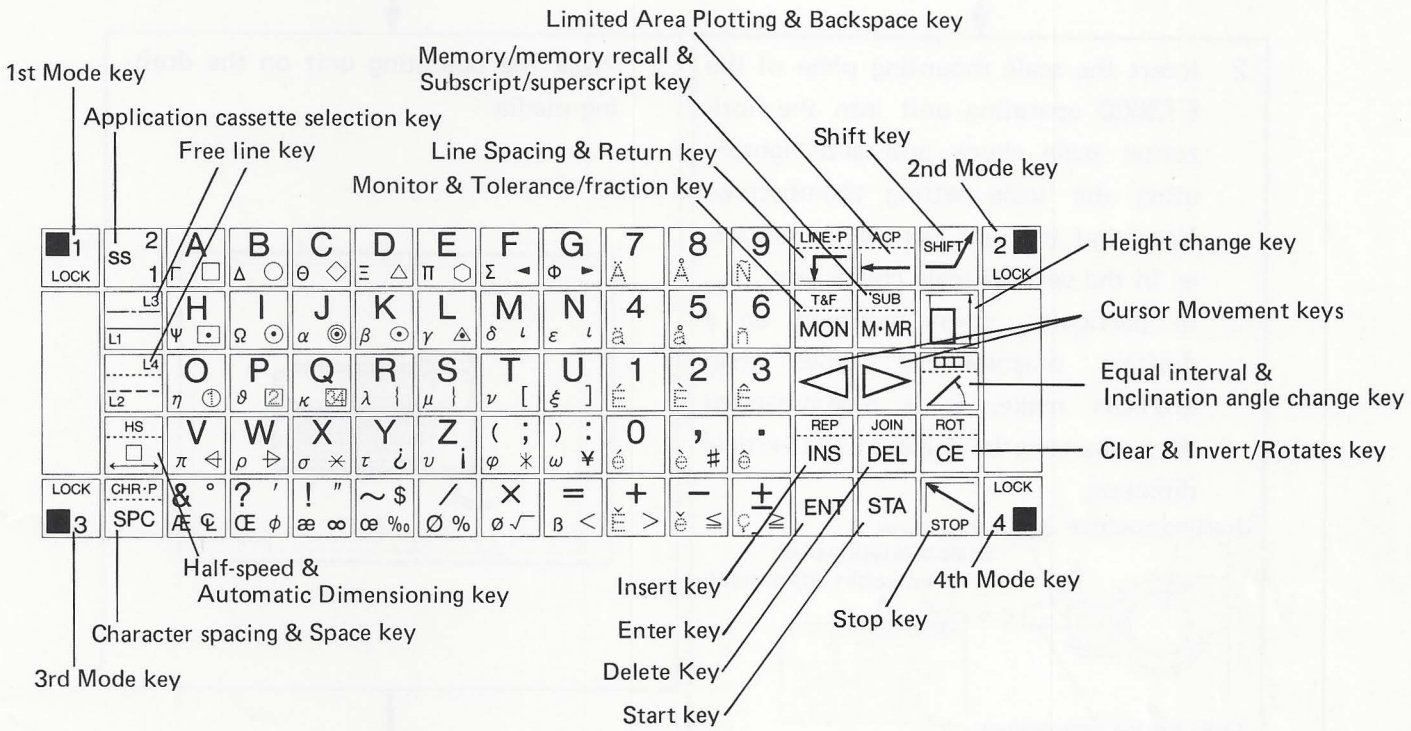
3-2 Operating Unit



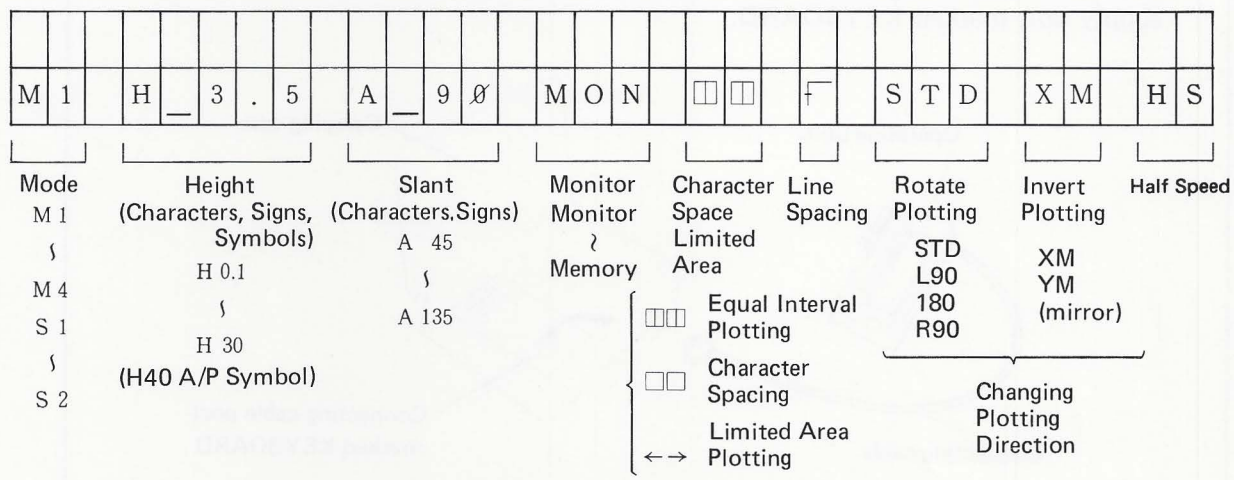
To use the ET3600 on a drafting machine, attach it to the scale chuck arm in place of a normal scale, as shown in the figure above. However, when mounted on a drafting machine of other than MUTOH make, rotate the protractor head downward 90° and mount on the vertical scale mounting plate. All keyboard operations can be made using a single hand, input being indicated on the display above the keyboard. When performing keyboard operations, it is recommended that the vertical and horizontal brakes of the drafting machine be kept locked. Since the plotting of alphanumeric characters and symbols is preprogrammed, you can call them when required at the keyboard and plot them using operational commands. With its built-in permanent memory, the ET3600 provides a convenient feature which enables frequently used words to be recalled repeatedly as required. Note that this memory is not cleared even if the power is switched off.

3-3. Main Keys

There are 74 keys in total, consisting of input keys, mode keys, function keys and character keys on which alphanumeric characters are engraved.



3-4 Display (LCD)



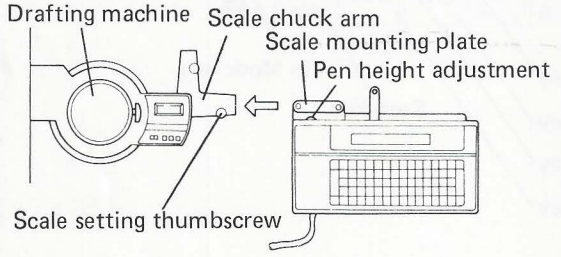
4. PREPARATION FOR USE AND MAINTENANCE

A. Using the ET3600 mounted on a drafting machine

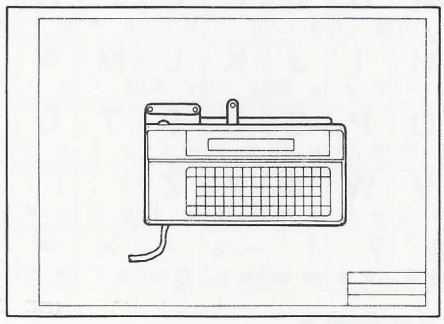
B. Using the ET3600 standalone (i.e., without a drafting machine)

1 Take the ET3600 operating unit out of its carrying case.

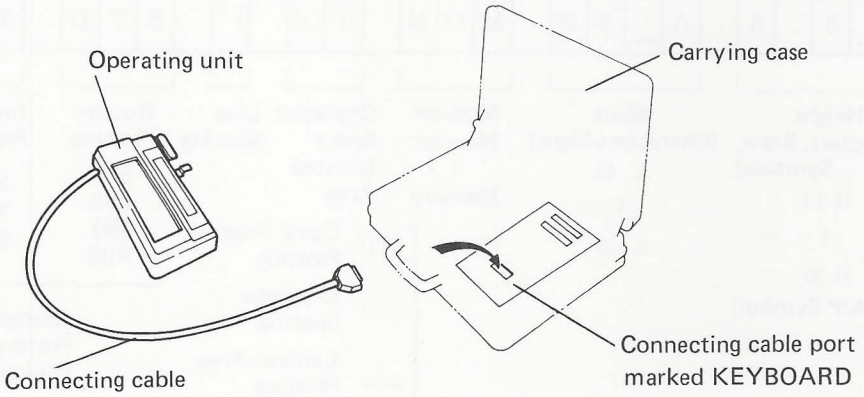
2 Insert the scale mounting plate of the ET3600 operating unit into the horizontal scale chuck arm and tighten, using the scale setting thumbscrew. Note that the unit can also be mounted in the vertical scale chuck arm.
In particular, when mounted on a drafting machine of other than MUTOH make, it is recommended that mounting be made in the vertical direction.



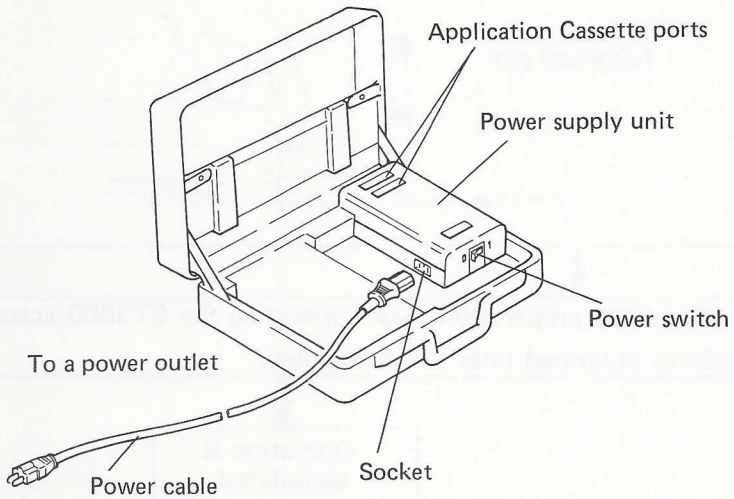
2 Place the operating unit on the drafting media.



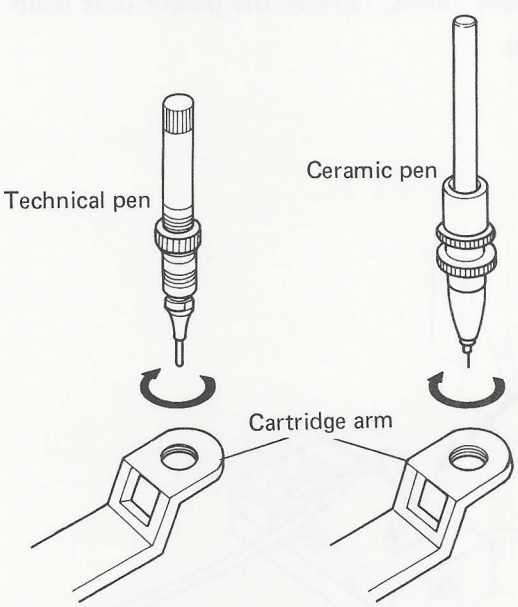
3 Insert the connecting cable of the operating unit into the connector in the power supply unit marked KEYBOARD.

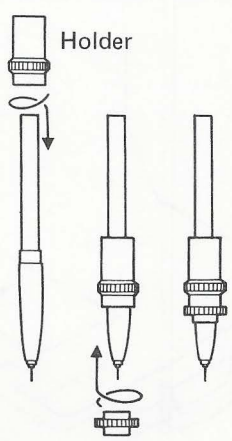


4 First, remove the power cable from the carrying case. Then insert one end into the socket at the left side of the power unit and switch the power on, at which point the green power light will come on.



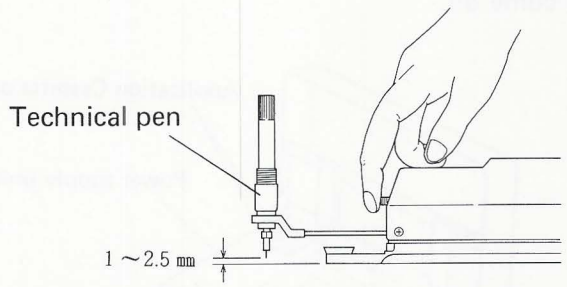
5 Mount a technical pen onto the cartridge arm. (Before mounting, shake the pen several times and verify that it is writing properly.) If the pen was left uncapped, it may not write due to dried up ink. In such cases, also, make a trial writing.





When using a ceramic pen, mount the holder to the pen first and then mount it onto the cartridge arm.

6 The optimum height of the technical pen above the drawing medium is 1 ~ 2.5mm. Adjust the height into this range using the height adjustment.



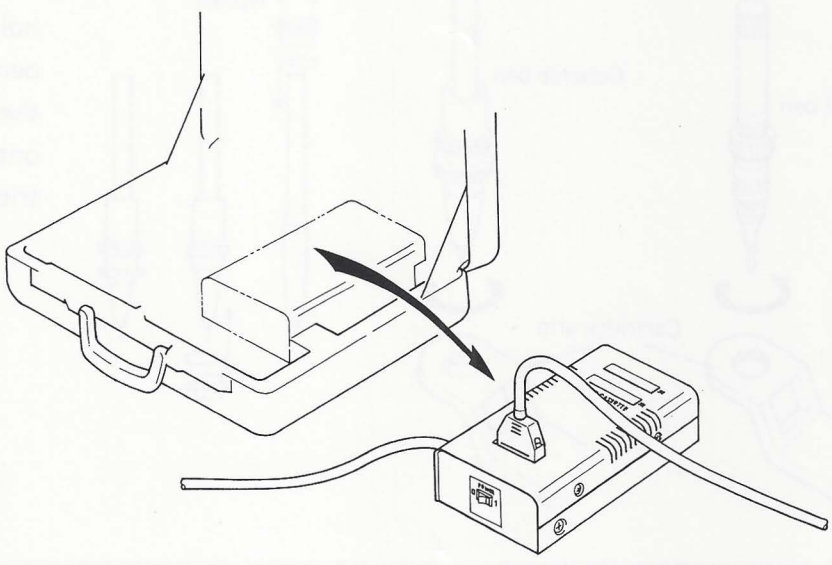
7 This completes preparation. Start operating the ET3600 according to the operation procedures described later in this manual.

Operation is completed

8 Switch power off and remove the pen. Then move the Cartridge Arm to the far left hand side end and ~~push it into the housing slowly~~. NO!!!

9 Remove the power cable and the connecting cable from the operating unit and put them back into the carrying case.

Note: When using the operating unit for many hours, remove the power unit from the carrying case to ensure better cooling.

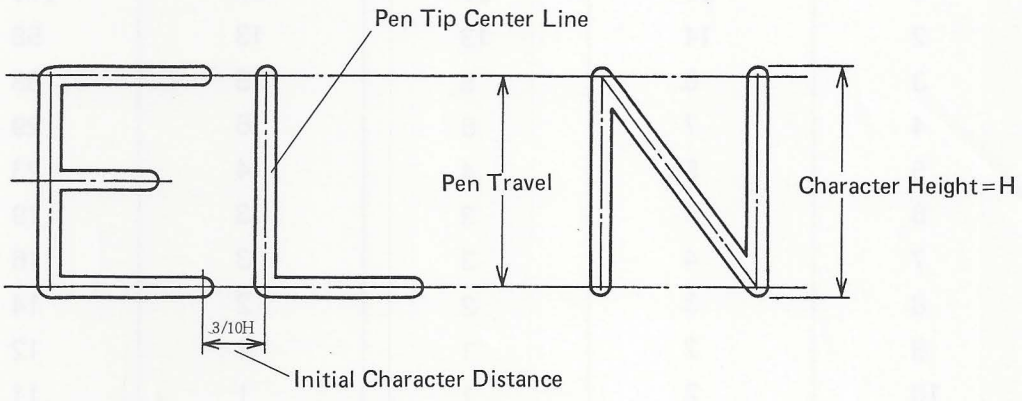


5. TYPES AND SIZE OF CHARACTER

1 Alphanumeric characters conform to ISO standards.

2 Automatic proportional spacing conforming to ISO standards is used between characters.

3 The charcter height and size are specified as follows. (ISO)



- Specification of the character height automatically specifies its width.
- The pen travel is set to 9/10H for less than the character height of 1 ~ 5mm (using a pen thickness of 1/10H).
- For characters of 5mm or greater, the pen travel is H=0.5mm (with a standard pen thickness of 0.5mm).

4 Memory references are made by using the numerical keys to specify addresses in the range 00 to 99, for a total of 100 addresses and 1500 characters of storage capacity.

* Precautions When Performing Memory Plotting

The memory has a capacity of 1500 characters, with the capacity at each address settable as desired to make up this total of 1500 characters. When the 1500 character limit is reached, remaining addresses become invalid, and also care should be taken for the limit of plottable number of characters in a line in accordance with the size of character or sign. The plottable lines and the plottable characters based on the varies of character height are shown as a reference in the table of next page.

Character Height, No. of Lines and No. of Characters per Line

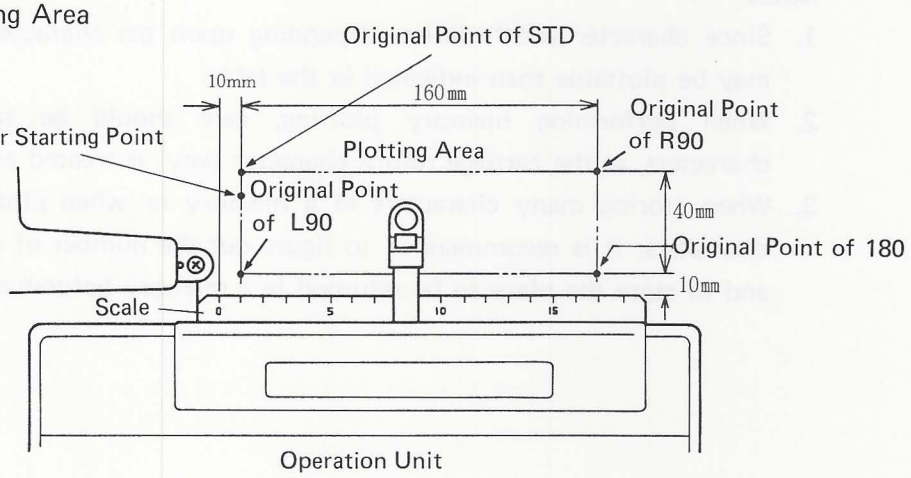
Character height (mm)	Number of character/ symbol lines plottable	Tolerance plotting (No. of characters)	Fraction plotting (No. of characters)	Memory plotting conditions
				No. of characters per line
1	28	27	27	116
2	14	13	13	58
3	9	8	8	38
4	7	6	6	29
5	5	4	4	23
6	4	3	3	19
7	4	3	3	16
8	3	2	2	14
9	2	1	1	12
10	2	1	1	11
11	2	1	1	10
12	2	1	1	9
13	2	1	1	9
14	2	1	1	8
15	1	1	1	8
16	1	1	1	7
17	1	1	1	7
18	1	1	unplottable	6
19	1	1	〃	6
20	1	1	〃	5
21	1	1	〃	5
22	1	1	〃	5
23	1	unplottable	〃	5
24	1	〃	〃	5
25	1	〃	〃	4
26	1	〃	〃	4
27	1	〃	〃	4
28	1	〃	〃	4
29	1	〃	〃	4
30	1	〃	〃	4

Notes

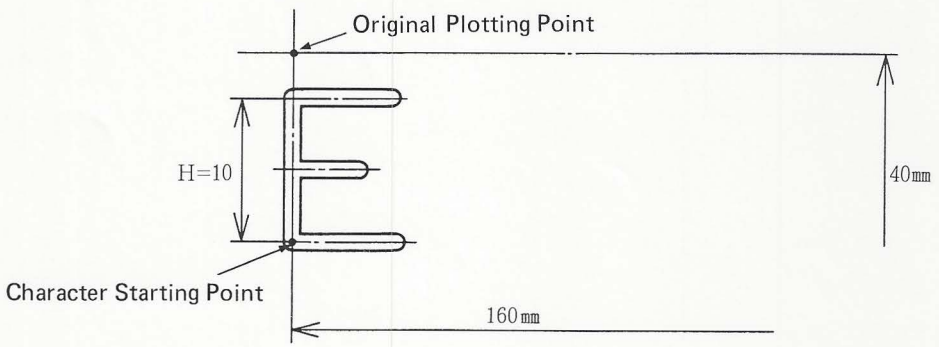
1. Since character width varies, depending upon the character, more characters may be plottable than indicated in the table.
2. When performing memory plotting, care should be taken in counting characters, as the carriage return character (key) is treated as one character.
3. When storing many characters in a memory or when plotting the large size characters, it is recommended to figure out the number of characters in a line and to store the place to be returned in a memory beforehand.

6. SETTING OF PLOTTING CONDITIONS

1 Plotting Area



As shown in the figure above, the plotting area starts at a height of 10mm above the scale edge and extends for a width of 160mm and a height of 40mm. Press the reset key to prepare for plotting, at which point the pen tip returns to the character starting point from which plotting is to start. In the example below, the character height is 10mm.



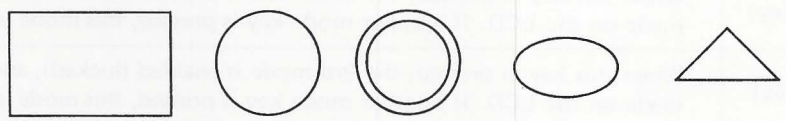
2 Monitor Display (LCD)

The LCD displays 32 characters on its upper level and 32 characters on its lower level. As the 33rd character is input, the display is shifted towards the left by one character, by means of a scroll function.

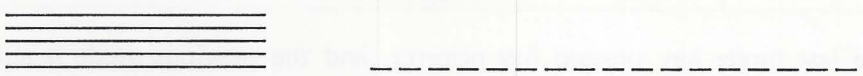
7. CHARACTERS

MUTOH SCRIBER ET3600
Character Sample
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789
ÄÅÃÁÀÂĂĄČÇËĒÉÈÊĔÖÓÒÔŎŠÜŪÚŬŽ
äåãáàâăąčçëēéèêĕöóòôšüūúùûŭž
ÆŒæœØøß
ΓΔθΞΠΣΦΨΩ
αβγδεηϑκλμνξπρστυφω
□○◇△⬡{}[]()#**&?¿!¡~/ ° ' '' ,.:;
√ <>≦≧×=+-±¥$%‰∞ϕ℄ ◄ ► ⊕ ⊕

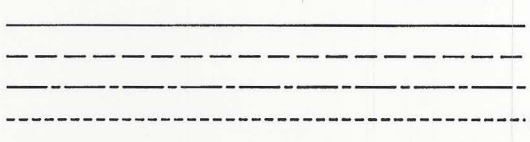
(25) [A1] [MUTOH] (enclosed plotting)



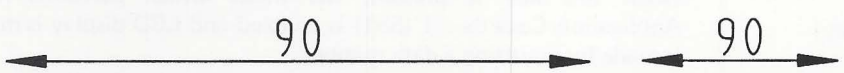
rectangle circle concentric circle ellipse triangle



parallel lines & straight line plotting



4 line types



Arrowhead and dimension line are drwn in both directions.

8. OPERATION

When power is first turned on, the display is as follows.

MUTOH			SCRIBER			ET3600		
MI	H-3.5	A-90	xxx	xx	x	STD	xx	xx

At this point, if keys are pressed, the letters corresponding to the keys appear in the upper left part of the display and are automatically plotted one after another.

The S, T and O keys are pressed to clear the upper line of the display (i.e., causing the message MUTOH SCRIBER ET3600 to disappear from the upper line).

At this point, if keys are pressed, the corresponding letters appear in the upper left end of the display and are plotted automatically.

The details of operation are as follows.

8-1 Mode Keys

1 LOCK (1st Mode Key)	The 1st mode is enabled when power is switched on or whenever this key is pressed.
2 LOCK (2nd Mode Key)	When this key is pressed, the 2nd mode is enabled (locked), and display is made on the LCD. If another mode key is pressed, this mode is cancelled.
LOCK 3 (3rd Mode Key)	When this key is pressed, the 3rd mode is enabled (locked), and display is made on the LCD. If another mode key is pressed, this mode is cancelled.
LOCK 4 (4th Mode Key)	When this key is pressed, the 4th mode is enabled (locked), and display is made on the LCD. If another mode key is pressed, this mode is cancelled.

* The last mode key pressed has priority, and the previous mode is automatically disabled. Note that the first mode is always enabled when the unit is switched on or whenever the reset key is pressed.

- **Special Symbol Mode (SS Key)**

SS 2 1 (SS1 Key)	When this key is pressed, the mode which performs recall from Application Cassette #1 (SS1) is enabled and LCD display is made. Recall is made by inputting a data number.
SHIFT SS 2 1 (SS2 Key)	When the 2nd shift key is pressed and the SS key is pressed, LCD display is made and the mode that recalls from Application Cassette #2 is enabled, the symbol being recalled by inputting the data number.

8-2 Character and Mode Keys

Mode	Character Key	Plotted Character or Symbol	
1st Mode	A B C	Capital Alphabet	ABC~Z
	(;) : , .		Parentheses ( ) Comma , Period . And & Question ? Exclamation ! Difference ~ Slash /
	& ° ? ' ! "		
	0 1 2	Numerals/ signs	012~9 ×÷+−±
2nd Mode	A B C	Small Alphabet	abc~z
	, . (;) :		, · Semi Colon ; Colon :
	& ° ? ' ! "		°Degree ' Minute '' Second
			$ /
	0 1 2	Numerals/ Signs	012~9 ×÷+−±
3rd Mode	A B C	Greek Letters	ΓΔΘ~ω , umlaut, accent, etc.
4th Mode	F G	Symbols	◄ ► ↑ ↓ Right & Left Arrows
	(;) : , /		* ¥ # ∞ % √ etc.
	R S		{ } Braces
	T U		[ ] Brackets
	= + − ±		<> ≦ ≧ Inequality Signs
	A B C		□ Square ○ Circle ◇ Diamond
	D E		△ Triangle ⬡ Hexagon
	O P Q		① A MUTOH Enclosed Circle, Square, Rectangle

Mode	Character Key	Plotted Character or Symbol	
	H Ψ ▣	Graphic Plotting	Causes Rectangle Plotting
	I Ω ⊙		Causes Circle Plotting
	J α ◎		Causes Concentric Circle Plotting
	K β ⊙		Causes Ellipse Plotting
	L γ △		Causes Triangle Plotting
	M δ ι		Causes Parallel Line Plotting
	N ε ι		Causes Straight Line Plotting
	0 ô 1 É 2 È	Numerals	0.1.2.~9 (Decimal point is input in the 1st or 2nd mode)

8-3 Function Keys

1) Adjustment of Character Base Line

Example

Plotting Example	Operation	Display
Adjust Baseline	8 Å ENT H Ψ ▣	H M 1 H 8 A 90
	4 ä ENT 2 È	2 M 1 H 4 A 90
	8 Å ENT 0 ô	0 M 1 H 8 A 90

[Note]

When plotting letters of different sizes on the same baseline, take care of the following points.

- If the height of the largest letter is known beforehand, input it to be plotted on the same baseline, even if the letter height is to be changed later.
- If the maximum letter height is unknown, repeat a carriage return once or twice. The 1st carriage return enables plotting up to a height of 10mm. If two carriage returns are used, letters up to a height of 16mm can be plotted without performing height adjustment.

2) Function Key Descriptions

Function Key		Functions
L3 / L1	Single Dot-Dash Line	Pressing the shift key and then this key plots a single dot-dash line (L3).
	Solid Line	While this key is pressed, a continuous solid line is plotted (L1).
L4 / L2	Dotted Line	Pressing the shift key and then this key plots a dotted line (L4).
	Broken Line	While this key is pressed, a continuous broken line is plotted.
HS	Half Speed	If the shift key is pressed and then this key is pressed, plotting speed is changed to one-half the normal speed. The half-speed mode is cancelled by pressing the shift key and then this key once again.
	Automatic Dimensioning	When this key is pressed, the automatic dimension value and line mode is enabled.
CHR·P / SPC	Character Spacing	Pressing the shift key and then this key enables the character spacing to be set in the range W=0 ~ 9/10h, with a setting resolution of W=1/10h.
	Space	This key moves the pen position by one character.
LINE·P	Line Spacing	Pressing the shift key and then this key enables the line to line spacing to be set with 0.1mm resolution.
	Carriage Return	Pressing this key moves the pen to the beginning of the next line.
ACP	Limited Area Plotting	Pressing the shift key and then this key causes automatic adjustment of character spacing within a limited area (character mortizing function).
	Backspace	This key moves the pen back by one character and pressing continuously moves the pen back to the beginning of the present line. When performing monitor/memory plotting, it moves the pen to the starting position.
SHIFT	Shift	This is the function shift key.
T&F / MON	Tolerance/Fraction	Pressing the shift key and this key causes plotting of tolerances and fractions.
	Monitor	This key is used to perform plotting after the characters to be plotted are indicated on the display.
SUB / M·MR	Subscript/ Superscript	Pressing the shift key and then this key plots subscripts and superscripts.
	Memory Key	If a character string to be plotted repeatedly is stored in memory, this key is used to recall the memory contents and plot the contents any desired number of times.
	Height Conversion	This key enables the setting of the character height in the range 1~30mm (up to 40mm when using the applciation cassette characters only) with a setting resolution of 0.1mm. This applies to characters and symbols.
◁ ▷	Cursor Movement	These keys are used to move the cursor to the left and right for monitor and memory plotting to enable editing of the displayed character string (inserting, deletion and correction).
	Equal Interval	Pressing the shift key and this key causes even spacing of numeral and alphabets.
	Character Inclination	Pressing this key enables the Y axis of characters, letters and symbols to be set in the range 45° ~ 135° with a setting resolution of 1°.
REP / INS	Insert	For monitor and memory plotting, this key is used to insert a character space into the character string indicated on the display.
JOIN / DEL	Delete	For monitor and memory plotting, this key is used to delete a character from the character string displayed.
		REP JOIN These keys correspond to various symbols on application cassettes.
ROT / CE	Invert/Rotate	Pressing the shift key and then this key can be used to rotate or reverse plotted characters.
	Clear	This key clears the entire upper line of the display.
ENT	Enter	Pressing this key enables plotting the monitored contents, finishing the input of memory and setting up the conditions of figure plotting.
STA	Start	This key enables plotting of the monitored and memorized figures.
STOP	Stop	This key causes the plotting to stop and the pen to move to the origin.

8-4 Warning Beeper

- If a value is input which exceeds the plotting area under the current plotting conditions (letter height and pen position), a warning beep sounds and the offending values will be ignored.
- The warning beeper sounds also when an improper operation is attempted.

8-5 Setting of Plotting Conditions

1) Character Height

1 The character height can be set in the range 1.0 ~ 30mm (with a setting resolution of 0.1mm) in all modes.

2 The character size conforms to ISO standards, with a pen width of 1/10H. For characters less than 5mm high, the pen travel is 9/10H. For characters greater than 5mm high, the pen travel is H=0.5mm for a pen thickness of 0.5mm.

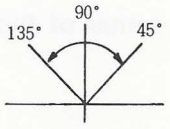
3 In the initialized state (i.e., at power on), the character height is set to 3.5mm automatically.

2) Changing the Character Height

Setting	Operation	Display
Height of 5mm	[5] [ENT] — Moves to the starting position (origin) of 5mm high characters	H = 5 — M1 H3.5 A90
Height of 12.5mm	[1] [2] [.] [5] [ENT] — Moves to the starting position (origin) of 12.5mm high characters	H = 12.5 — M1 H3.5 A90
Change 7.5mm to 7.8mm (change last digit only)	[7] [.] [5] [JOIN DEL] [8] [ENT] — Moves to the starting position (origin) of 7.8mm high characters * Input of the decimal point is made in the 1st or 2nd mode.	H = 7.8 — M1 H3.5 A90
1 Exceeds limit of plotting area 2 Input 15.5mm 3 Change 15.5mm to 16.5mm Ex. 1 (when "DEL" key is used) Ex. 2 (when "DEL" key is not used)	[3] [5] [ENT] — If the input exceeds the limits of the plotting areas, the warning beep sounds to indicate this out-of-bounds condition. [1] [5] [.] [5] — Input a new setting. [JOIN DEL] [JOIN DEL] [JOIN DEL] — Delete the last 3 digits. [6] [.] [5] [ENT] — Input new values. [ROT CE] [1] [6] — Re-input after clearing. [.] [5] [ENT] — The pen moves to the 16.5mm origin point.	① H=35 — M1 H3.5 A90 ② H = 15.5 — M1 H3.5 A90 ③ H = 16.5 — M1 H3.5 A90

3) Changing the Character Inclination (Default 90°)

The inclination of characters can be set in the range of 45° to 135° with a setting resolution of 1°.



Setting	Operation	Display
• Plot 1 2 3 with an inclination of 75°. 123 ∠75°	[7 Ä] [5 å] [ENT] Set the angle. [1 É] [2 È] [3 Ê]	A = 75 — M1 H3.5 A90
• Plot 1 2 3 with an inclination of 120°. 123 ∠120°	[1 É] [2 È] [0 ó] [ENT] Set the angle. [STOP] [1 É] [2 È] [3 Ê]	A = 120 — M1 H3.5 A90 123 — M1 H3.5 A120

* When the angles in the range of 91° to 130° are set, press "STOP" key first before plotting.

4) Equal Didit Spacing

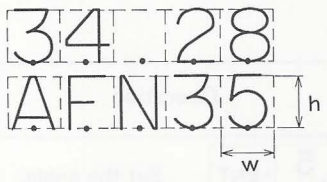
Available for both numerals and alphabet.

Plotting example	Operation	Display
• Equal Interval Plotting 11.2	[STOP] [1 É] [1 É] [. ô] [2 È] Standard → 11.2 1 1 . 2	11.2 — M1 H3.5 A90 □□

* Input after returning to the origin by pressing the "STOP" key.

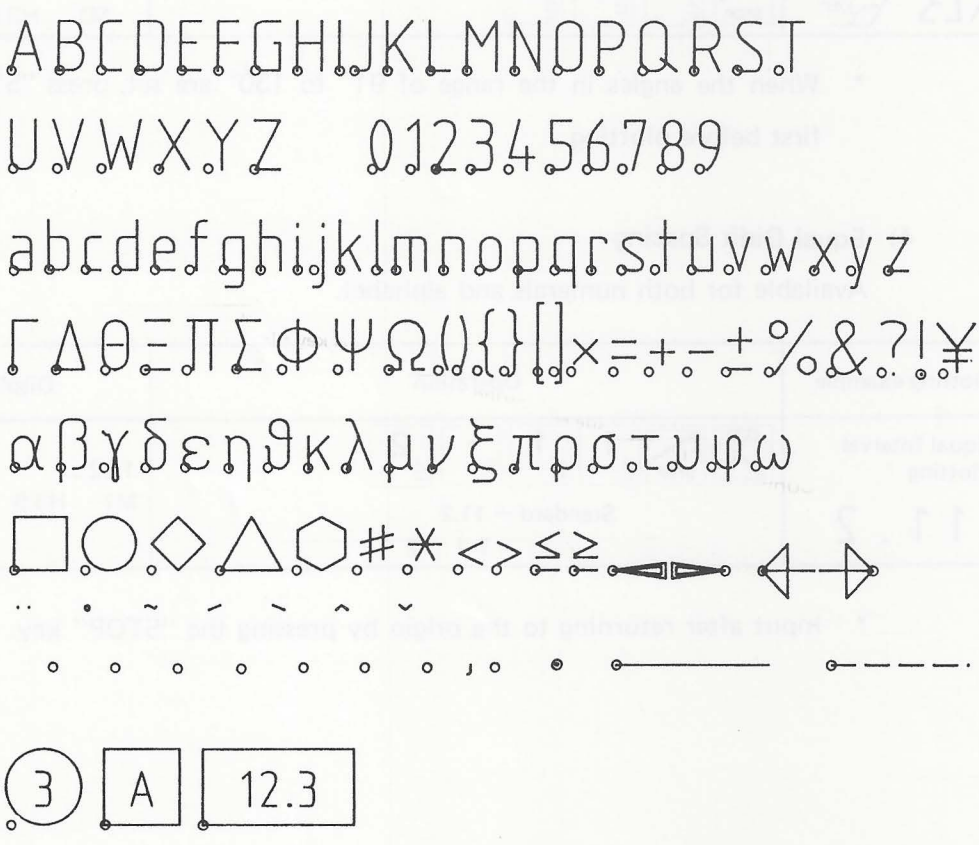
5) Character Origin

* When plotting evenly spaced characters, the character origin is at the center of the bottom of the character (i.e., the pen stopping position).



The mark • indicates the character origin for evenly spaced character.

* For standard plotting (i.e., not evenly spaced plotting), the origin is at the extreme lower left of the character (marked with ⊙ below).



8-6 General Plotting Method (Direct Plotting)

1) Capital Letters

Plotting Example	Operation	Display
Plot ABCD	A B C D	ABCD— M1 H3.5 A90

2) Small Letters

Plotting Example	Operation	Display
Plot the single letter lower case a. a	2 ■ LOCK, A	a— M1 H3.5 A90
Plot the series a b c d. abcd	2 ■ LOCK, A B C D	abcd— M1 H3.5 A90

3) Numerals (Usable in 1st, 2nd and 4th Modes)

Plotting example	Operation	Display
Plot 01234	0 1 2 3 4	01234— M1 H3.5 A90

4) Symbols

Plotting example	Operation	Display
Plot #	LOCK 4 ■, , #	#— M1 H3.5 A90
Plot % √	LOCK 4 ■, / % , × √	% √— M1 H3.5 A90
Plot $	2 ■ LOCK, ~ $	$— M1 H3.5 A90

5) Tolerances and Fractions

1 Return (overlay) plotting of tolerances and fractions is not pressible in direct plotting. Use monitor or memory plotting if their return plotting is required.

2 In direct plotting, pressing the [ENT] key initiate plotting of tolerances and fractions and at the same time cancel their functions.

3 There are limits in character heights for plotting tolerances and fractions. (Ref. Page 12)

Plotting Example	Operation	Display
Plot $50^{0}_{-0.2}$	Press the SPC key for a tolerance value without a sign (+ or – sign) before it. 5 0 SHIFT T&F MON CHR·P SPC 0 – 0 · 2 ENT	*The ␣ indicates a space. 50␣0 – 0.2 _ M1 H3.5 A90
Plot $50^{+0.2}_{0}$	Be sure to input the upper tolerance value first. 5 0 SHIFT T&F MON + 0 · 2 CHR·P SPC 0 ENT	50 + 0.2 _ 0 _ M1 H3.5 A90
Plot $50^{+0.2}_{-0.1}$	5 0 SHIFT T&F MON + 0 · 2 – 0 · 1 ENT	50 + 0.2 – 0.1 _ M1 H3.5 A90
Plot $50^{+0.05}_{+0.01}$	5 0 SHIFT T&F MON + 0 · 0 5 + 0 · 0 1 ENT	50 + 0.05 + 0.01 _ M1 H3.5 A90
Plot 50 ± 0.3	5 0 SHIFT T&F MON ± 0 · 3 ENT	50 ± 0.3 _ M1 H3.5 A90
Plot kg/m	Input the numerator first, followed by the denominator after the slash key, which is used to distinguish the entry as a fraction. 2 LOCK SHIFT T&F MON K G / M ENT	kg/m _ M2 H3.5 A90
Plot $1/5$	SHIFT T&F MON 1 / 5 ENT	1/5 _ M1 H3.5 A90

6) Subscripts and Superscripts

1 Return (overlay) plotting of subscripts and superscripts is not possible in direct plotting. Use monitor or memory plotting if their return plotting is required.

2 In direct plotting, pressing the [ENT] key initiate plotting of subscripts and superscripts, and at the same time cancel their functions.

Plotting Example	Operation	Display
Plot A_1	If a subscript is required at the lower level, input it as it is. [A] [SHIFT] ['SUB M·MR] [1] [ENT]	A □ 1_ M1 H3.5 A90
Plot m^3	[2 ■ LOCK] [M] [SHIFT] ['SUB M·MR] [CHR·P SPC] [3] [ENT] Press the [SPC] key to put a subscript at the upper level.	m □ 3_ M2 H3.5 A90

7) Symbols (□○◇△⬡)

Plotting Example	Operation	Display
Square h	[LOCK 4 ■] [A] The height of the square will be the specified character height. (At power on, H=3.5mm)	□_ M4 H3.5 A90
15mm high Square 15mm	[□] [1] [5] [ENT] * Convert the height [LOCK 4 ■] [A]	□_ M4 H15 A90
Circle h=ø	[LOCK 4 ■] [B] The diameter of a circle is the specified character height.	○_ M4 H15 A90
Triangle h	[LOCK 4 ■] [D] All triangles are regular triangles.	△_ M4 H3.5 A90

* Circles, squares and triangles can be plotted in both symbol and graphic modes, selection of mode being made according to the application.

8) Arrows

Plotting Example	Operation	Display
Plot dimension line with arrow head ◄ ►	LOCK 4 ■ F Σ ◄ * Plot arrows only. LOCK 4 ■ CHR·P SPC CHR·P SPC G Φ ► If pen position is at left hand side of the plot area, press the SPC key more than twice, then plot arrow.	← M4 H3.5 A90
Plot a dotted line with arrow head ◄- - - - ►	LOCK 4 ■ F Σ ◄ SHIFT L4 L2 G Φ ►	← → M4 H3.5 A90 ··· L4
Plot at half speed a single dot-dash line with an arrow head. ◄-·-·-	LOCK 4 ■ SHIFT HS □ F Σ ◄ SHIFT L3 L1	← M4 H3.5 A90 ··· L3
Cancel half speed	SHIFT HS □	– H1 H3.5 A90 ··· HS

9) Enclosed Plotting

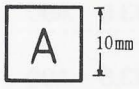
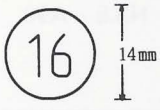
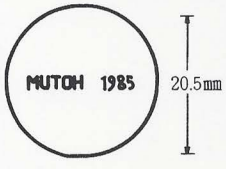
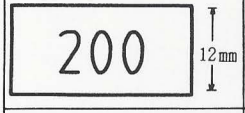
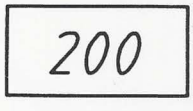
1 Specify the height of an enclosing square or rectangle (diameter, in the case of a circle).

2 The ratio of height to length for the rectangle is 2:1.

3 The character height automatically changes according to the number of characters plotted within the enclosure. However, if the character height is less than 1mm, a warning beep will sound and no plotting will occur. In such cases, decrease the number of characters or change the height (diameter) of the enclosure.

4 Return (overlay) plotting is not possible in direct plotting mode. Use monitor or memory plotting mode if return plotting of the enclosure is required.

5 In direct plotting, pressing the ENT key initiate plotting of the enclosure and at the same time cancel their functions.

Plotting Example	Operation	Display
Plot A inside a square of height 10mm 	[ ] [1 É] [0 ó] [ENT] [LOCK 4■] [P ϑ ⊡] ← * Specify the type and height of the enclosure. [■1 LOCK] [A Γ □] ← * Specify the plotted character (align the position). [ENT] ← * Start plotting	enclose □_ M4 H10 A90 enclose □A_ M1 H10 A90
Plot 16 in a circle of 14mm diameter. 	[ ] [1 É] [4 ä] [ENT] [LOCK 4■] [O η ①] ← * Specify the type and height of the enclosure. [1 É] [6 ñ] ← * Specify the plotted character (align the position). [ENT] ← * Start plotting (numerals are usable in the 4th mode).	enclose O_ M4 H14 A90 enclose O16_ M4 H14 A90
Plot MUTOH 1985 in a circle of 20.5mm diameter. 	[ ] [2 È] [0 ó] [· ô] [5 å] [ENT] [LOCK 4■] [O η ①] [■1 LOCK] [M δ ι] [U ξ]] [T ν [] [O η ①] [H ψ ⊡] [CHR·P SPC] [1 É] [9 Ñ] [8 Å] [5 å] [ENT]	enclose O_ M4 H20.5 A90 enclose O MUTOH␣1985_ M1 H20.5 A90
Plot 200 in a rectangle of 12mm height. 	[ ] [1 É] [2 È] [ENT] [LOCK 4■] [Q κ ⊠] [2 È] [0 ó] [0 ó] [ENT] (Numerals are usable in the 4th mode.)	enclose rec_ M4 H12 A90 enclose rec 200_ M4 H12 A90
Plot a 75°-inclined 200 in a rectangle of 12mm height. 	[ ] [1 É] [2 È] [ENT] [ ] [7 Ä] [5 å] [ENT] [LOCK 4■] [Q κ ⊠] [2 È] [0 ó] [0 ó] [ENT] * The rectangle itself may not be included.	M4 H12 A90 M4 H12 A75 enclose rec 200_ M4 H12 A75

10) Automatic Dimension

Plotting Example	Opration	Display
50 ←→ Scale 1:1	LINE·P HS 5 0 ENT STA	←→_ M1 H3.5 A90 ← 50 →_ M1 H3.5 A90
50 ←→ Scale 1:2	LINE·P HS 5 0 ENT 2 5 STA	←→_ M1 H3.5 A90 ← 50 → 25_ M1 H3.5 A90
	2 5 shows the actual plotting length. Be sure to press LINE·P key before the operation starts.	← 50 → 25_ M1 H3.5 A90

* When a dimension is given to an actual drawing, care should be taken if the drawing paper is expanded or contracted. The length of dimension can be input at 0.1mm increment.

  Example

  Plot 50mm in the actual dimension of 49.5mm.

  HS 5 0 ENT 4 9 · 5 STA

* Memory and monitor plotting are not available.

8-7 Graphics Plotting Method

1 Return (overlay) plotting is not available in direct plotting. Use monitor or memory plotting if return plotting is required.

2 In direct plotting, pen moves to the plot-starting point by pressing the ENT key and the plotting will be started by pressing the STA key.

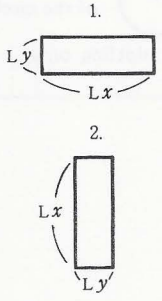
3 In memory or monitor plotting, pressing the STA key moves the pen to the plot-starting point, and the plotting is started by pressing the STA key once again.

4 Graphics plotting function will be cancelled as soon as the plotting is performed.

1) Rectangle Plotting

Plotting Conditions

1. Standard rectangle
2. Rotated rectangle
3. Memory plotting



Setting the range

1. Standard rectangle (180°)

   0.1 mm≦Lx≦160 mm (MAX)

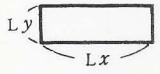
   0.1 mm≦Ly≦ 40 mm

2. Rotated rectangle (R90°, L90°)

   0.1 mm≦Lx≦ 40 mm

   0.1 mm≦Ly≦160 mm (MAX)

* Graphic plotting is done as interactive monitor plotting.

Plotting Example	Operation	Display
 Plot a rectangle with the dimensions of Lx=120.5 mm of Ly=35 mm	SUB M·MR ▷ Memory Plotting in address 00. (one graphic at each address only) * Non-stored plotting LOCK 4 ■ H Ψ ⊡ 1 2 0 · 5 ENT 3 5 ENT ENT * ⊡ Move to the origin of the rectangle. STA STA * Start plotting ⊡ memory plotting only	rec ℓX = 120.5 ℓY = 35 M1 H3.5 A90

* Specify any number in the range 00~99 for memory storage. Do the same for the memory function described below as well.

2) Circle Plotting

Plotting Conditions

1. Standard Circle
2. Rotated Plotting
3. Memory Plotting

Angle Setting Range

0.5 mm≦ r ≦20mm

Plotting Example	Operation	Display
Plot a circle of radius r = 12mm.	SUB M·MR ◁ 1 É ▷ Memory plotting in address 01 LOCK 4 ■ I Ω ⊙ 1 É 2 È ENT ENT ⊙ * Move to the origin (center) of the circle. STA STA → memory plotting only	cir r=_ M4 H3.5 A90 cir r=12.0_ M4 H3.5 A90

3) Concentric Circle Plotting

* The ratio of outer to inner circle radius is 10:8.

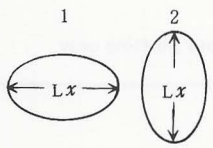
The plotting conditions are the same as those for circle (Section 2) above.

Plotting Example	Operation	Display
Plot a concentric circle with r=10mm.	SUB M·MR ◁ 2 ▷ Memory plotting in address 2 LOCK 4 ■ J α ◎ 1 0 ENT ENT STA STA ← memory plotting only	concen r = _ M4 H3.5 A90 concen r =10 _ M4 H3.5 A90

4) Ellipse Plotting

Plotting Conditions

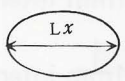
1. Standard plotting
2. Rotated plotting
3. Memory plotting



Setting range

Major diameter $0.1\,\text{mm} \leqq Lx \leqq 40\,\text{mm}$ (0.1mm interval)

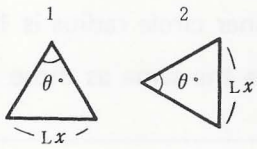
Angle 5 °~75° (1 interval)

Plotting Example	Operation	Display
 Plot an ellipse of 35 angle and 16mm major diameter.	ex. Address No. 03 SUB M·MR ◁ 3 ▷ Memory plotting LOCK 4 ■ K β ⊙ 3 5 ENT 1 6 ENT ENT STA STA ← memory plotting only	ellipse θ=_ M4 H3.5 A90 ellipse θ=35 lx=_ M4 H3.5 A90 ellipse θ=35 lx=16 _ M4 H3.5 A90

5) Triangle Plotting

Plotting Conditions

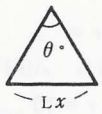
1. Standard plotting
2. Rotated plotting
3. Memory plotting



Setting range

Base $1.0 \leqq Lx \leqq 40$mm (0.1mm interval)

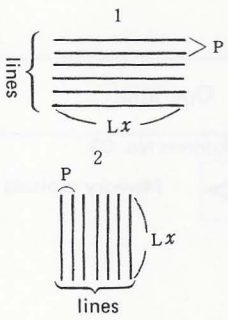
Angle 15 °～ 120 ° (1 interval)

Plotting Example	Operation	Display
 Plot a triangle of $Lx = 12$mm $\theta = 60°$	ex. Address No. 04 'SUB M·MR ◁ 4 ä ▷ Memory plotting LOCK 4 ■ L γ △ 1 É 2 È ENT 6 ñ 0 ë ENT ENT STA STA ← memory plotting only	tri l x=_ M4 H3.5 A90 tri l x=12 θ=_ M4 H3.5 A90 tri l x=12 θ=60_

6) Parallel Line Plotting

Plotting conditions

1. Standard plotting
2. Rotated plotting
3. Memory plotting

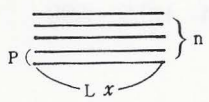


Setting range

1. Length of 1. $0.1 \text{ mm} \leqq Lx \leqq 160$ mm (0.1mm interval)
2. Length of 2. $0.1 \text{ mm} \leqq Lx \leqq 40$ mm (0.1mm interval)

Interval $0.1 \text{ mm} \leqq$ Pich (0.1mm interval)

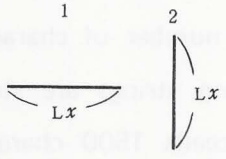
Number of Lines $2 \leqq n$ (Each line interval)

Plotting Example	Operation	Display
 $Lx = 80$ mm P=7 mm n=5 Plot parallel lines (solid line: L1)	'SUB M·MR ◁ 5 å ▷ Address Memory plotting (addresses are consecutive) LOCK 4 ■ M δ ι L3 L1 * Four line types available ex: A single dot-dash line is plotted by pressing Shift ← Specify the line type 8 Å O η ① ENT 7 Ä ENT 5 å ENT ENT STA STA ← memory plotting only	par L=_ M4 H3.5 A90 MEM par L=1 lx=_ par L=1 lx=80 P=_ par L=1 lx=80 P=7 n=_ par L=1 lx=80 P=7 n=5_ M4 H3.5 A90 ··· L1

7) Straight Line Plotting

Plotting Conditions

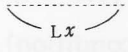
1. Standard plotting
2. Rotated plotting
3. Memory plotting



Setting range

1. Length of 1. 0.1 mm≦Lx≦160 mm (0.1mm interval)
2. Length of 2. 0.1 mm≦Lx≦ 40 mm (0.1mm interval)

(4 Kinds of lines are available: Solid, broken, dotted and single dot-dash)

Plotting Example	Operation	Display
 Lx = 100 mm Plot a dotted line (dotted line L4)	'SUB M·MR ◁ 6 ñ ▷ Address number No. of memory address desired in memory plotting LOCK 4 ■ N ε ι SHIFT L4 L2 1 É 0 ó 0 ó ENT ENT STA STA	line L =— line L = 4 ℓX =— line L = 4 ℓX = 100.0— M4 H3.5 A90 .... L4

8-8 Memory Plotting and Editing

1 100 Memory addresses in the range 00 to 99 are usable.

2 There is no limit to the number of characters that may be stored at each address. Therefore, if long strings are stored in memory, and the total number of characters exceeds 1500 characters, even if addresses remain, these will not be usable. (For example, if 50 characters are stored in each address, only addresses from 00 to 29 are usable. For 100 characters at each address, the usable address range is 00 through 14.)

3 The memory address display is at the upper left of the liquid crystal display. When the memory key is pressed, the 00: is displayed (starting condition).

4 To recall the contents of an address at which a long string has been stored, when the address value is changed, the first 29 characters at that address are displayed. The remaining characters (i.e., characters from the 30th character on) may be displayed by scrolling the display one character at a time.

5 Editing (insertion, deletion and correction) is completed each time the enter key is pressed.

6 Since such setting conditions such as inversion and rotation are not stored in memory, they are stored in the standard (STD) condition and, when plotting is actually done, reversal direction and rotation are specified before plotting (this applies to character height and inclination as well). The number of characters per line and number of lines will depend upon the character height setting.

7 Refer to Character Height, No. of Lines and No. of Characters per Line in Page 12.

Plotting Example	Operation	Display
Input MUTOH JAPAN.	'SUB M·MR Indicate memory input/output	00:_ M1 H3.5 A90 MEM
	▷ Move cursor from below : to the right	00:_ M1 H3.5 A90 MEM
	M U T O H CHR·P SPC	00: MUTOH␣_ M1 H3.5 A90 MEM
	J A P A N · Input completed	00: MUTOH␣JAPAN._ M1 H3.5 A90 MEM 00:_ MUTOH␣JAPAN. M1 H3.5 A90 MEM
Plot from the current pen stopped position.	STA	00:_ MUTOH␣JAPAN.
Plot from the plotting area origin.	STOP STA	00:_ MUTOH␣JAPAN.
Plot after making a new line.	LINE·P STA	00:_ MUTOH␣JAPAN.
Plot the same contents overlaid (return plotting).	ACP STA The pen returns to the M position and overlay plotting occurs.	00:_ MUTOH␣JAPAN.
Change the memory contents from MUTOH JAPAN to MUTOH ET3600.	▷ × 7 times Move the cursor to the position under J.	00: MUTOH␣JAPAN.
	E T 3 6 0 0	00: MUTOH␣ET3600_
	ENT Editing Completed	00:_ MUTOH␣ET3600

Plotting Example	Operation	Display
Change the address from 00 to 01.	◁ Move the cursor under the 1's digit.	00 : MUTOH_ET3600 M1 H3.5 A90 MEM
	1 Set the address to 01.	01:
Input A250.	▷ Move the cursor from under the : to the right.	01:_
	A 2 5 0	01: A250_
	ENT Input completed.	01: A250 M1 H3.5 A90 MEM
Change memory contents from A250 to A-250.	▷ Move the cursor under the 2.	01: A250
	REP INS Insert a space at the cursor position.	01: A_250
	− Insert a hyphen.	01: A-250
	ENT Editing complete.	01: A-250 M1 H3.5 A90 MEM
Change memory contents from A-250 to A-5.	▷ Move the cursor to under the 2.	01: A-250
	JOIN DEL Delete the character at the cursor position.	01: A-50
	▷ Move the cursor to under 0.	01: A-50
	JOIN DEL Delete the character at the cursor position.	01: A-5_
	ENT Edition complete.	01: A-5
Input $40^{+0.1}_{-0.2}$ B~B'.	◁ 2 ▷ Set the address to 02 and move the cursor to the right of :.	02:_
	4 0	02: 40_
	SHIFT T&F MON Specify the tolerance and fraction.	02: 40Λ± _
	+ 0 · 1	02: 40Λ±+0.1_
	− 0 · 2	02: 40Λ±+0.1−0.2_
	ENT Cancel tolerance/fraction	02: 40Λ±+0.1−0.2ΛE _
	B ~ $ B 2 ■ ? '	02: 40Λ±+0.1−0.2ΛE B~B' _
	ENT Input complete.	02: 40Λ±+0.1−0.2ΛE B~B'

Plotting Example	Operation	Display
Change memory contents from $40^{+0.1}_{-0.2}$ B~B′ to 40±0.1 B~B′.	[▷] X 3 times — Move the cursor to under the Λ.	02: 40Λ± +0.1-0.2Λ E B~B′ M1 H3.5 A90 MEM
	[JOIN DEL] — Delete the tolerance up to Λ±+0.1 –0.2ΛE.	02: 40 B~B′
	[REP INS]	02: 40_·····→ B~B′
	[SHIFT] [T&F MON] — Specify tolerance/fraction.	02: 40Λ± _ B~B′
	[±] [0] [.] [1] — Correct input	02: 40Λ± ±0.1_ B~B′
	[ENT] — Cancel tolerance/fraction.	02: 40Λ± ±0.1Λ EB~B′
	[ENT] — Edition complete.	02: 40Λ± ±0.1ΛEB~B′ M1 H3.5 A90 MEM
	* Corrections of enclosure (circle, square and rectangle) tolerances, fractions, superscripts and subscripts and automatic dimensioning memory contents should always be made by first deleting and then inserting. The entire top line of the display and the bottom memory are cleared and are filled with asterisks.	
Cancel memory function	['SUB M·MR] — The entire top line of the display and the bottom memory are cleared and are filled with asterisks.	
Clear memory contents	['SUB M·MR] [◁] [1] [▷] — Call address No. 1 from address memory	01: A-5
	[ROT CE] [ENT] — Clean memory in address No. 1	01: _

Note:

1. The display for memory plotting of enclosures (circle, square, rectangle), tolerances, fractions, superscripts, and automatic dimensioning appears as follows.

Enclosing circle	Λ	_	Λ ○ ..... Λ E_
Enclosing square	Λ	_	Λ □ ..... Λ E_
Enclosing rectangle	Λ	_	Λ ◫ ..... Λ E_
Tolerance	Λ	_	Λ ± ..... Λ E_
Fraction	Λ	_	Λ / ..... Λ E_
Subscript	Λ	_	Λ □ ..... Λ E_
Superscript	Λ	_	Λ □ ..... Λ E_

Beginning mark for each function

cursor

Identification mark for each function to be displayed after pressing the [ENT] key.

End mark for each function to be displayed after pressing the [ENT] key.

Cursor

2. Insertions, deletions and corrections are made as Λ..... E as a unit.
   - For corrections before end mark for each function is displayed (before pressing the [ENT] key), press the [JOIN / DEL] key as many times as the number of characters already input.
   - For corrections after end mark for each function is displayed (after pressing the [ENT] key), the contents should be corrected as follows:
     a. In monitor plotting, press the [ROT / CE] key and input once again.
     b. In memory plotting, move the cursor under the mark Λ of the beginning mark Λ'.....Λ E and delete by pressing the [JOIN / DEL] key. If insertion is required, press the [REP / INS] key and input.

3. Storing graphics in memory

- In storing rectangle, circle, concentric circle, ellipse, triangle, parallel lines and straight line in memory, press the [ENT] key once again after pressing it for the input of each setting value so that the cursor moves under the mark:
- To recall and plot graphics from the memory, press the [STA] key once, then the pen moves and stops at plot origin. Press the [STA] key once again and the plotting will be started.
- For editing the memory-input graphics, input of the setting conditions should be done once again from the beginning since all the setting conditions are cleared by the [JOIN / DEL] key.

8-9 Monitor Plotting and Editing

1 Monitor plotting refers to displaying the contents to be plotted, verifying these contents and then plotting. Editing operations such as insertion, deletion and correction of display contents are the same as for memory plotting.

2 After verifying display contents, to plot press the START or ENTER key.

3 Even after plotting has been completed, the displayed contents will not disappear and overlaid plotting (returned plotting) is possible, in the same manner as for memory plotting.

4 If replotting is not required, the CLEAR key can be pressed to clear the display contents.

5 Up to 200 characters can be monitored.

* Bold characters for upper and slender characters for lower line

Plotting Example	Operation	Display
Plot MUTOH SCRIBER.	T&F MON, M U T O H LINE·P, S C R I B E R ENT Plot 2nd column.	MUTOH_ M1 H3.5 A90 MON SCRIBER— M3 H3.5 A90 MON
Change the monitor contents from MUTHO to MUTOH.	T&F MON, M U T H O ◁ Move cursor. ◁ O H ENT Reperform input.	MUTHO_ MUTHO MUTHO MUTOH_ M1 H3.5 A90 MON
Change the monitor contents from MUTOH to SCRIBER.	T&F MON, M U T O H ROT CE Clear all. S C R I B E R ENT	MUTOH— M1 H3.5 A90 MON SCRIBER— M3 H3.5 A90 MON
Perform overlaid plotting of the same contents (return plotting)	ACP, STA	
Cancel monitor plotting.	T&F MON The LCD command monitor is erased and replaced entirely by asterisks.	M3 H3.5 A90 * * *

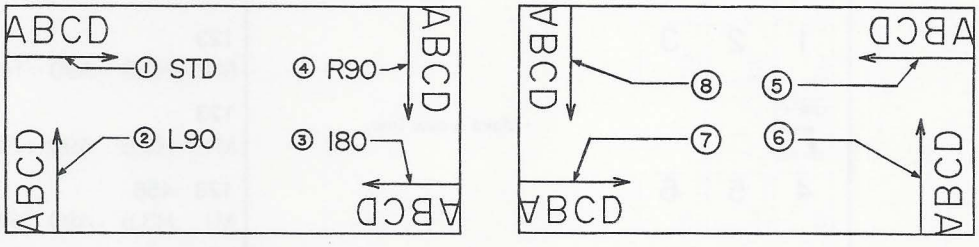
8-10 Condition Setting Plotting

1) Reversed and Rotated Plotting (Plotting Direction Conversion)

1 Six types of specification methods exist, STD (standard), L90, 180, R90, XM and YM (the M of XM and YM stands for mirror reversal).

1. STD (Standard)
2. L90 (90 left rotation)
3. 180 (180 rotation)
4. R90 (90 right rotation)
5. STDYM (Same as 180XM)
6. L90YM (Same as R90XM)
7. 180YM (Same as STDXM)
8. R90YM (Same as L90XM)

Either specification may be used.



2 When plotting either reversed or rotated, since the origin moves, always press the STOP key before starting to plot.

3 If overlaid (return) plotting is required, select the monitor plotting mode.

4 Reversed or rotated plotting can not be stored in memory. Store them in memory in the standard (STD) condition, and when plotting is actually done by recalling them, specify reversal or rotation direction before plotting.

Plotting Example	Operations	Display
Plot 	SHIFT ROT CE — Select reversal/rotation. L 9 0 — Specify direction. ENT ← Move origin. A B C	ROT = M1 H3.5 A90 STD ** ROT = 90 M1 H3.5 A90 L90 ** ABC M1 H3.5 A90 L90 **
Plot	SHIFT ROT CE — In this case, reversal/rotation is not specified. R 9 0 Y M — Specify direction. ENT ← Move the origin. 1 2 3 LINE·P — Make a new line. 4 5 6	ROT = M1 H3.5 A90 STD ** ROT = R90 M1 H3.5 A90 R90 ** ROT = R90 YM M1 H3.5 A90 R90 YM 123 M1 H3.5 A90 R90 YM 123 M1 H3.5 A90 R90 YM 123 456 M1 H3.5 A90 R90 YM
Cancel inversion/ reversal and specify STD.	SHIFT ROT CE S T D ENT Cancelling this mode returns to the standard mode.	ROT = STD M1 H3.5 A90 STD **

2) Line Spacing Specification

1 The value for line spacing may be set up to 40mm in 0.1mm steps, regardless of the character height specification that has been made. (A specification of 40mm, however, will not enable plotting of two lines and thus return is made to the origin.)

2 The line spacing setting value may not be stored in memory.

3 If spacing is specified that is smaller than the standard spacing, descenders (i.e., such English small letters as g, j, p, q and y) may interfere with letters on the line below.

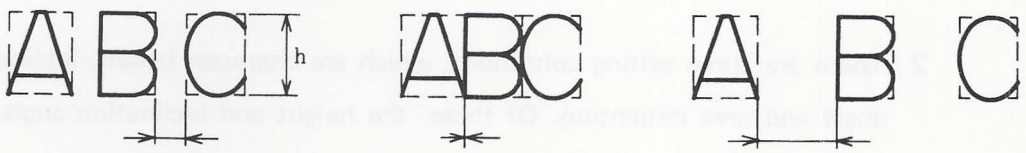
Setting	Operations	Display
Plot characters of 3.5mm height on paper with a new line every 7mm spacing.	STOP — If the pen is mid-way, return it to the origin. SHIFT + LINE·P — Select line spacing specification. 7 Ä — Indicate line pitch as 7mm. ENT — Setting complete	P =_ M1 H3.5 A90 *** ** P = 7_ M1 H3.5 A90 *** ** — M1 H3.5 A90 *** **
Cancel	SHIFT + LINE·P — When cancel is made, return is made to the standard mode.	M1 H3.5 A90 *** ***

3) Character Spacing Specification

1 Character spacing is specified in the standard mode as 3/10 of the character height H.

2 The character spacing may be set from 0/10H to 9/10H in 1/10H units.

3 The character spacing setting value may not be stored in memory.



3/10H (standard) 0/10H (min) 9/10H (max)

4 When the character spacing has been specified, equally spaced characters may not be plotted.

5 Character spacing can not be used for such plotting like tolerances, fractions, superscripts and subscripts.

Setting	Operations	Display
Set a character spacing of double the standard mode (i.e., 6/10H)	STOP — Return to the origin. SHIFT + CHR·P SPC — Specify character spacing setting. 6 Ü — Input the character spacing nominator. ENT — Setting complete.	P = _ /10H M1 H3.5 A90 *** □□ P = 6/10H M1 H3.5 A90 *** □□ — M1 H3.5 A90 *** □□
Cancel	SHIFT + CHR·P SPC — When cancel is made, return is made to the standard mode.	M1 H3.5 A90 *** **

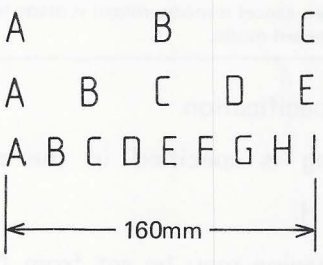
4) Limited Area Plotting (Auto character space adjusting function)

1 This mode of plotting is used to automatically adjust the character spacing depending on the number of characters to be plotted in a limited area.

a. Number of characters: over 2 up to 23 characters

b. Area dimension: Maximum 160mm at 0.1mm unit

c. Minimum character spacing: 1/10 Hmm



2 There are three setting conditions, which are character height, inclination angle and area dimension. Of these, the height and inclination angle will be the current height and angle.

3 If some characters do not fit into the specified area, such characters will appear flashing in the display. To correct this condition, specify smaller value for character height until flashing is gone.

4 For operations other than return plotting, cancel the limited area plotting function.

5 The contents of the limited area are not storable in memory.

Setting	Operations	Display
Plot the characters 123.4 with a character height of 3.5mm in 7mm area	STOP — Return to the origin.	
	SHIFT ACP — Select limited area plotting.	ℓX =_
	7 — Input area dimensions.	ℓX = 7_
	ENT — Setting complete.	ℓX = 7␣␣␣␣_
	1 2 3 . 4 — Input characters to be plotted.	ℓX = 7␣␣␣␣123.4_
	ENT — Input complete.	ℓX = 7.0␣␣123.4 M1 H3.5 A90 *** ←→
	Plot (even after plotting is completed, the display will not be cleared.)	
Change character height to 3mm	□ 3 ENT	
	STA — Plot (even after plotting is completed, the display will not be cleared.)	ℓX = 7.0␣␣123.4 M1 H3.0 A90 *** ←→
Overlay plotting (return plotting)	STOP STA — To plot from the origin, return to the origin first.	
	ACP STA — To plot from the pen stopping position, backspace to the start of the 123.4 character string.	ℓX = 7.0␣␣123.4 M1 H3.5 A90 *** ←→
Cancel	SHIFT ACP — When cancel is performed, return is made to the standard mode.	M1 H3.5 A90 *** **

5) Return Plotting (Overlay Plotting)

1 In the direct plotting mode, the widths of the up to 32 characters from the last character are stored and, when the backspace key is pressed, and the same key is pressed once again, overlay plotting is possible. Note, however, that if the backspace key is pressed for the characters after 33rd character, only a fixed amount will be backspaced each time and these spaces do not agree with the width of the characters. If the characters are plotted from the origin, however, overlay plotting of the entire string from the origin is possible after returning to the origin.

2 When plotting with equal spacing, pen returns to the space origin and overlay plotting of any number of characters is possible.

3 For monitor plotting and memory plotting, any number of characters and lines are managed as a block, enabling the backspace key to be used to return to the starting position for overlaid plotting. (Refer to the sections on monitor and memory plotting.)

9. SPECIFICATIONS

Items	Specifications
Plotting area	160 x 40mm
Plotting pen	Hollow-tip drafting pen
Resolution	0.025mm
Character & symbol height	1 ~ 30mm (0.1mm setting resolution)
Graphic height	1 ~ 40mm (0.1mm setting resolution)
Application symbol height	1 ~ 40mm (0.1mm setting resolution)
Character inclination angle	45 ~ 135° (±45° with respect to Y axis), 1° setting resolution
Character pitch	Automatic proportional, conforming to ISO standards Equal spacing (digits aligned) Character pitch may be set in the range 0/10h ~ 9/10h (with a setting resolution of 1/10h)
Line pitch	Automatic line feed Line feed settable in the range 0.1 ~ 40mm (0.1mm setting resolution)
Memory	00 ~ 99 = 1,500 characters (no limitation of capacity at each address) Battery backed up
Display	Liquid crystal with scroll function: 32ch x 2 lines = 64 characters
Keyboard	Flat-panel switches
Application	Two application cassettes installable
Plotting type	Alphanumeric characters, upper case, lower case, numerals conforming to ISO standards Special symbols conforming to JIS standards (partly Mutoh specified)
Operation unit dimensions	302 x 181 x 52mm
Operation unit weight	1.4kg (excluding connecting cable)
Power requirements	85 ~ 130V AC, 50 or 60 Hz or 170 ~ 270V AC, 50 or 60 Hz
Fuse	1A (6.4dia x 30mm tubular type)
Power consumption	42W
Operating temperature	5 ~ 40°C
Storage temperature	0 ~ 60°C

10. DIAGNOSING SUSPECTED TROUBLE

If you suspect that the ET3600 is not operating properly, first check the following points.

If no operation is possible:

- Check if the power plug is properly inserted into its outlet.
- Check if the green power switch lamp is on.
- Check if the fuse is blown.

If operation is possible but plotting is not:

- Check if the technical pen is out of ink.
- Check if the pen tip is dried up.
- Check if the pen tip is damaged. (If damaged, replace it.)

If line quality is irregular or plotting is not possible:

- Check if the technical pen is securely mounted onto the cartridge arm.
- Check if the pen tip is close enough to the drawing media.

After these checks, if the ET3600 is still not operating properly, contact the distributor or dealer from which you purchased the ET3600.

Warning.-This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Printed in Japan